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10/826,917	04/16/2004	Chiaki Aoyama	IIP-117-A	2272

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EXAMINER	
REPKO, JASON MICHAEL	
ART UNIT	PAPER NUMBER
2628	

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/826,917	AOYAMA, CHIAKI	
	Examiner	**Art Unit**	
	Jason M. Repko	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-5, 7-9, 13, 15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

3. Claims 1, 2, 7, 8 and 13 appear to be directed to a mathematical algorithm. The claimed invention does not result in a physical transformation nor does the claimed invention appear to provide a useful, concrete and tangible result. Claims 1, 2, 7, 8 and 13 are directed to a process that does nothing more than solve a mathematical problem and manipulate abstract ideas.

4. Annex 5 of the "Interim Guidelines for Examination of Patent Application for Patent Subject Matter Eligibility" provides guidance with respect to determining the patentability of mathematical algorithms. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Benson, 409 U.S. at 71-72, 175 USPQ at 676. Thus, a process consisting solely of mathematical operations, i.e., converting one set of number into another set of numbers does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

5. Claims 1, 2, 7, 8 and 13 are directed to a process consisting solely of operations manipulating a set of mathematical entities. The result of the operations is set numbers representing intensity values arranged as a two-dimensional array. The invention fails to use the result to enable its functionality to be realized. Additionally, the asserted practical application in

the specification of generating an image is "on-screen presentation of a three-dimensional object." The practical application is not recited in the claims nor does it flow inherently therefrom. Therefore, claims 1, 2, 7, 8 and 13 are directed to non-statutory subject matter.

6. Claims 3-5, 9 and 15 are directed to a computer that solely calculates a mathematical algorithm, which is non-statutory subject matter. Claims 3-5, 9 and 15 are directed to a generic computing system performing a mathematical algorithm (*see paragraph 54 on p.16 of the descriptive portion of the specification: "Each of those elements may be implemented as a program module (or code) which operates in concert with each other to cause a computer to perform specific process steps."*). In effect, claims 3-5, 7, 8, 13 and 15 seek to cover every substantial practical application of the abstract idea itself.

7. To expedite a complete examination of the instant application, the claims rejected under 35 U.S.C. 101 as non-statutory subject matter are further rejected as set forth below in anticipation of applicant amending the claims to place them within the four categories of invention.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 2, 8, 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claims 2, 8, 11 and 12 recite the limitation "the second data comprising correction values which correct lines of sight to correspond to directions and positions of rays of light on the pixels

of the picture." However, the lines of sight appear to be defined based upon the second and first data. In claims 2, 8, 11 and 12 are indefinite as it is not clear how the second data can both provide a definition and supply a correction to "the lines of sight." That is, the definition of a "line of sight" appears to be self-referential: a line of sight is defined by a correction to lines of sight. It is recommended that the Applicant clarify the relationship between the second data and the defined lines of sight.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. **Claims 1, 6, 7, 10, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,594,850 to Noyama et al in view of U.S. Patent No. 6,028,606 to Kolb et al and in further view of U.S. Patent No. 4,970,666 to Welsh et al.**

14. With regard to claim 1, Noyama et al discloses "a method for compositing a computer-graphics image and a picture taken by a camera (*lines 41-44 of column 4: "Some specific objects*

of the invention are: (1) to create a composite image from a CG image and a natural image...") comprising:

a. defining a three-dimensional model, a viewpoint (*lines 26-29 of column 6: "In FIG. 1, a CG model 10 consists of an object shape model 12 made up of object shape and object surface attributes, a light source model 14 including the light source position and light properties, and an eye position 16."*), and a plane of projection, in a space established on a computer (*lines 29-34 of column 6: "In ordinary computer graphics, the aim is to create a CG image 20 projected on a two dimensional plane, which will not be described since it is well known. In this invention, however, in addition to data gathering by creating the CG image 20 as in the prior art..."*);

b. tracing the lines of sight extending from the viewpoint through the plane of projection and the three-dimensional model to obtain attributes of portions of the three-dimensional model corresponding to the projection pixels (*line 66 of column 7 through line 3 of column 8: "The ray tracing starts from the eye 16 and continues along a straight line connecting the eye 16 and the pixel being processed on the projection plane until striking an object, e.g. a shape object 12 (104), then a check is made as to whether or not the object struck is the light source 14 (106)."*), thereby forming a two-dimensional image of the three-dimensional model on the plane of projection (*lines 39-41 of column 8: "The determined pixel color is written to the intrinsic image 28 (126)."*); and

c. superposing (*Figure 8)* the two-dimensional image (*20*) on the picture (*30*) to generate a composite image (*50*) (*lines 22-29 of column 10: "Then the simulation section 300 creates a final composite image by combining the transformation data for only the*

window (not the inside wall) of the memory section 354, on top of the temporary composite image. The final composite image 50 displays a region 55 including the object 66 in front of the interior wall and in the room behind the glass of the window 64.")."

15. Noyama et al does not expressly disclose "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer, the conditions comprising at least one of the tilt angle of the camera relative to a ground surface and the position of a light source relative to the camera" or "defining lines of sight extending from the viewpoint to projection pixels on the plane of projection so that each of the lines of sight conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera."

16. Kolb et al discloses a function to define lines of sight based upon the "calibration data" for a camera system, "defines lines of sight extending from the viewpoint to projection pixels on the plane of projection so that each of the lines of sight conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera" (*lines 57-59 of column 12: "After computing W the ray tracing algorithm is applied to construct (108) a ray from x' to x", and then compute (110) the ray from x" to the scene data"; lines 6-9 of column 8: "Rather than computing the direction of a ray using the ray tracing procedure directly, ray tracing can alternatively be used to define a function that accurately approximates the way in which rays are acted upon by the lens system."*).

17. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the physical camera model calibration data as taught by Kolb et al to determine the direction of the rays in the method and system for compositing acquired and synthetic images

disclosed by Noyama et al. The suggestion and motivation for doing so is given by Kolb et al in lines 39-49 of column 2:

> *For example in many applications (video special effects, augmented reality, etc.) it is desirable to seamlessly merge acquired imagery with synthetic imagery...In both of these situations it is important that the synthetic imagery be computed using a camera model that closely approximates the real camera and lens system.*

18. Kolb et al discloses "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer" (*lines 36-39 of column 5: "The location and orientation of the model camera relative to the radiant scene is chosen to mimic the physical camera's position."*); however, the combination of Noyama et al and Kolb et al does not expressly disclose "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer, the conditions comprising at least one of the tilt angle of the camera relative to a ground surface and the position of a light source relative to the camera." Welsh et al discloses "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer, the conditions comprising at least one of the tilt angle of the camera relative to a ground surface and the position of a light source relative to the camera" (*lines 1-5 of column 6: "The camera vantage point, direction (center) of view, and camera settings are needed to determine the perspective of the captured video image so that any objects which are added to the actual environment can be rendered in the same perspective."; lines 15-18 of column 6: "In addition, other camera settings are recorded including lens settings, camera*

settings, camera height from the ground and angle of the camera from the horizontal."; lines 29-35 of column 6: *"The environmental conditions, date and time of day are also noted and recorded, as they will be used in setting lighting positions and color in the rendering software at a later step, so that the lighting direction and color temperature used in rendering the object will accurately match that of the environment in which it is placed"*).

19. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to accurately model the extrinsic camera parameters as suggested by Welsh et al in addition to the intrinsic camera parameters as disclosed by the Noyama et al and Kolb et al combination. The motivation for doing so would have been to improve the quality of the final image, as rendering using the extrinsic parameters disclosed by Welsh et al would cause the appearance of the synthetic elements in the final image to match the appearance of the acquired elements more accurately than rendering using intrinsic parameters alone. Therefore, it would have been obvious to further modify the to obtain the invention specified in claim 1.

20. With regard to claim 6, the program recited is similar in scope to a computer implementation of the method of claim 1; Noyama et al discloses a computer implementation in lines 24-29 of column 13: *"As explained in the foregoing, in accordance with the present invention images created with computer graphics are automatically and simultaneously transformed into transformation data that can be directly handled in image simulation and, therefore, a computer running an image simulation program can be immediately used for creating composite images with natural images."* Claim 6 is rejected with the rationale of claim 1.

21. With regard to claim 7, Noyama et al discloses "a method for rendering a three-dimensional model created by computer graphics into a two-dimensional image to be superposed on a picture taken by a camera to form a composite image, the method comprising:

d. defining a viewpoint (*lines 26-29 of column 6*), and a plane of projection, in a space established on a computer where the three-dimensional model is located (*lines 29-34 of column 6*);

e. defining lines of sight extending from the viewpoint to projection pixels on the plane of projection (*lines 18-21 of column 9, see rejection of claim 1*);

f. tracing the lines of sight extending from the viewpoint through the plane of projection and the three-dimensional model to obtain attributes of portions of the three-dimensional model corresponding to the projection pixels (*line 66 of column 7 through line 3 of column 8*); and

g. setting the obtained attributes of the portions of the three-dimensional model to the projection pixels corresponding thereto, to form a two-dimensional image of the three-dimensional model on the plane of projection (*lines 39-41 of column 8; lines 22-29 of column 10*)."

22. Noyama et al does not disclose "defining lines of sight extending from the viewpoint to projection pixels on the plane of projection so that each of the lines of sight conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera." Kolb et al discloses this limitation in lines 57-59 of column 12 as shown in the rejection of claim 1.

23. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the physical camera model calibration data as taught by Kolb et al to determine the

direction of the rays in the method and system for compositing acquired and synthetic images disclosed by Noyama et al. The suggestion and motivation for doing so is given by Kolb et al in lines 39-49 of column 2 as shown in the rejection of claim 1. Therefore, it would have been obvious to combine Noyama et al with Kolb et al to obtain the invention specified in claim 7.

24. With regard to claim 7, Kolb et al discloses "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer" (*lines 36-39 of column 5*); however, the combination of Noyama et al and Kolb et al do not expressly disclose "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer, the conditions comprising at least one of the tilt angle of the camera relative to a ground surface and the position of a light source relative to the camera." Welsh et al discloses "defining, in accordance with conditions in which the picture is taken, a three dimensional model, a viewpoint, and a plane of projection, in a space established on a computer, the conditions comprising at least one of the tilt angle of the camera relative to a ground surface and the position of a light source relative to the camera." (*lines 1-5 of column 6; lines 15-18 of column 6; lines 29-35 of column 6*).

25. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to accurately model the extrinsic camera parameters as suggested by Welsh et al in addition to the intrinsic camera parameters as disclosed by the Noyama et al and Kolb et al combination. The motivation for doing so would have been to improve the quality of the final image, as rendering using the extrinsic parameters disclosed by Welsh et al would cause the appearance of the synthetic elements in the final image to match the appearance of the acquired

elements more accurately than rendering using intrinsic parameters alone. Therefore, it would have been obvious to further modify the to obtain the invention specified in claim 7.

26. With regard to claim 10, the program recited is similar in scope to a computer implementation of the method of claim 7; Noyama et al discloses a computer implementation in lines 24-29 of column 13: *"As explained in the foregoing, in accordance with the present invention images created with computer graphics are automatically and simultaneously transformed into transformation data that can be directly handled in image simulation and, therefore, a computer running an image simulation program can be immediately used for creating composite images with natural images."* Claim 10 is rejected with the rationale of claim 7.

27. With regard to claims 13 and 14, Kolb et al discloses "a method comprising shifting a starting position of a corresponding line of sight from the origin of the corresponding line of sight by a displacement amount corresponding to the displacement vector, and wherein the line of sight to a projection pixel is determined using the origin, the displacement vector, and the direction vector" (*lines 28-33 of column 10: "To trace a ray 76 from an image point x' through a thick lens, a point S on the exit pupil is chosen. A point 70 of intersection of a ray from x' to S with P' is found, and then translated parallel to the axis to a point 74 on P. A ray from 74 through x, the image of x', is then used to sample the scene. The image of x' is found using equation (01)."*).

28. Kolb et al does not expressly disclose "the method step of defining each line of sight extending from the view point to the projection pixels using a displacement vector comprising a 3-D vector representing displacement from the viewpoint to a displaced viewpoint, a direction

vector comprising a 3-D vector representing direction from the displaced viewpoint toward the projection pixel" as the vectors disclosed in Kolb et al originate at the image surface (*lines 44-47 of column 8*). However, this feature is determined to be an obvious matter of design choice as defining the ray origin in terms of a position on an image surface or a point behind the image surface passing through the image surface at that position would perform the function of representing a line of sight equally well, as one representation can be easily written in terms of the other. Similarly, translating the ray x' to an image x in Kolb et al using equation (01) is analogous to a using a displacement vector to perform the same operation. Therefore, it would have been prima facie obvious to modify the line of sight definition and translation operations of Kolb et al to obtain the invention as specified in claims 13 and 14 because such a modifications would have been considered a mere design considerations which fails to patentably distinguish over the prior art of Kolb et al.

Response to Arguments

29. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection necessitated by amendments to the claims.

Allowable Subject Matter

30. Claims 2-5, 8, 9 and 15 are rejected under 35 U.S.C. 101, but contain subject matter not found in the prior art.

31. Claims 11 and 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

32. The following is a statement of reasons for the indication of allowable subject matter: Claims 2, 8, 11 and 12 recites the limitation "providing a calibration table having first data and second data correlated with each other, the first data comprising positions of pixels of the picture taken by the camera and the second data comprising correction values which correct lines of sight to correspond to directions and positions of rays of light incident on the pixels of the picture, where the lines of sight are defined based upon the directions and positions of the rays of light incident on the pixels of the picture corresponding to the projection pixels, obtained by looking up the second data with the first data in the calibration table." Kolb et al discloses a function to define lines of sight based upon the "calibration data" for a camera system, "defines lines of sight extending from the viewpoint to projection pixels on the plane of projection so that each of the lines of sight conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera" (*lines 57-59 of column 12; lines 6-9 of column 8*). Benjamin Mora, Jean Pierre Jessel, René Caubet, "A New Object-Order Ray-Casting Algorithm," October 27, 2002, Proceedings of the Conference on Visualization '02 (Mora et al) discloses "providing a table having first data and second data correlated with each other (*Figure 2*), the first data concerning positions of pixels (*section 3.1: " Therefore, a square made of four neighboring pixels is subdivided and a list of relative coordinates corresponding to the projection of the cell is associated with each subdivision (Pixel index in fig. 2a)."*), the second data concerning ray data (*section 3.1: " The set of preprocessed rays (fig. 2b) is used to find out the ray entry point within the cell...Thus, a ray number pointing to the best representative preprocessed ray is assigned to every pixel of the projection lists (ray index in fig 2a)."*). However, neither references independently or in combination teach or render obvious the limitation "providing a calibration

table having first data and second data correlated with each other, the first data comprising positions of pixels of the picture taken by the camera and the second data comprising correction values which correct lines of sight to correspond to directions and positions of rays of light incident on the pixels of the picture, where the lines of sight are defined based upon the directions and positions of the rays of light incident on the pixels of the picture corresponding to the projection pixels, obtained by looking up the second data with the first data in the calibration table."

33. With regard to claim 3, Noyama et al discloses "compositing a computer-graphics image created by rendering a three-dimensional model and a picture taken by a camera (*Figure 8, see rejection of claim 1*), comprising:

h. obtaining lines of sight extending from a viewpoint to the three-dimensional model (*lines 18-21 of column 9, see rejection of claim 1*);

i. generating a two-dimensional image on the plane of projection from the three-dimensional model (*lines 39-41 of column 8, see rejection of claim 1*) by tracing the lines of sight so as to obtain attributes of portions of the three-dimensional model corresponding to the projection pixels on the plane of projection (*line 66 of column 7 through line 3 of column 8, see rejection of claim 1*);

j. superposing the two-dimensional image on the picture, to generate a composite image (*lines 22-29 of column 10, see rejection of claim 1*)."

34. Noyama et al does not expressly disclose basing the line of sight calculation on the acquired imagery and corresponding camera. With regard to lines 10-12 of claim 3, Kolb et al discloses "each of lines of sight passing through projection pixels on a plane of projection

conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera" and basing the line of sight calculations "upon the directions and positions of the rays of light incident on the pixels of the picture" *(lines 57-59 of column 12: "After computing W the ray tracing algorithm is applied to construct (108) a ray from x' to x", and then compute (110) the ray from x" to the scene data"; lines 6-9 of column 8: "Rather than computing the direction of a ray using the ray tracing procedure directly, ray tracing can alternatively be used to define a function that accurately approximates the way in which rays are acted upon by the lens system.")*. As shown in the rejection of claim 1, it would have been obvious to one of ordinary skill in the art to modify Noyama et al with Kolb et al to model the lines of sight after those of the picture taken by the camera to obtain the advantage of "seamlessly merging acquired imagery with synthetic imagery" as suggested by Kolb et al.

35. Neither Kolb et al nor Noyama et al independently or in combination disclose "a calibration table storage unit for storing a calibration table having first data and second data correlated with each other, the first data comprising positions of pixels of the picture taken by the camera and the second data comprising directions and positions of rays of light incident on the pixels of the picture corresponding to optical properties of the camera" and "a line-of sight calculation unit for obtaining lines of sight extending from a viewpoint to the three-dimensional model based upon the directions of positions of the rays of light incident on the pixels of the picture, obtained by looking up the second data with the first data in the calibration table, so that each of lines of sight passing through projection pixels on a plane of projection conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera" as recited in claim 3.

36. U.S. Patent No. 7,027,642 to Rubbert et al teaches a calibration table in lines 20-24 of column 24 (see also U.S. Patent No. 7,068,825 to Rubbert et al). However, Rubbert et al does not disclose a calibration table disclosed in combination with the features recited in claim 3.

37. Claims 4, 5 and 15 contain allowable subject matter as they depend from claim 3.

38. Claim 9 recites the calibration storage unit and line-of-sight calculation unit of claim 3, and contains allowable subject matter for this reason.

Conclusion

39. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 6,268,863 to Rioux discloses a method for rendering images based on camera calibration data. U.S. Patent No. 6,166,744 to Jaszlics et al discloses combining synthetic and real-world images. Ned Greene, Paul S. Heckbert, "Creating raster Omnimax Images from Multiple Perspective Views Using the Elliptical Weighted Average Filter," June 1986, IEEE Computer Graphics and Applications, v.6 n.6, p.21-27 discloses relating a pixel to "a ray through a projection lens," (Section 3) and a weight lookup table (Section 5). Nelson Max, "Computer Graphics Distortion for IMAX and OMNIMAX Projection," December 1983, Procedings of NICOGRAPH '83, p. 137-159 (Max) discloses correcting rays to conform to an OMNIMAX projection. Craig Kolb, Don Mitchell, Pat Hanrahan, "A Realistic Camera Model for Computer Graphics," August 1, 1995, SIGGRAPH 1995 Conference Proceedings, pp. 317-324 (Kolb) discloses modifying rays to correspond to a physical camera. Geregly Vass, Tamás Perlaki, "Applying and Removing Lens Distortion in Post Production," May 2003, Proceedings of the Second Hungarian Conference on Computer Graphics and Geometry 2003 discloses distorting images based on camera parameters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Repko whose telephone number is 571-272-8624. The examiner can normally be reached on Monday through Friday 8:30 am -5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMR

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER